



Environmental management and sustainable fishing activities in Rivers State, Nigeria

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Abstract

Fishery production is significant to Nigerian economy in view of its roles in providing cheap source of food protein, nutrition security, income, employment and a means of foreign exchange in riparian communities. The study examined the environmental management and sustainable fishing activities in Rivers State, Nigeria. Both primary and secondary data sources were utilized for the study. Multistage sampling method was employed, whereby 5 communities were selected from 5 randomly selected LGAs. Thereafter, convenient sampling was used to select 100 fishermen/women whereby 20 each were randomly selected from each LGA. Data were presented in Tables and percentages and analyzed using SPSS 24.0. Findings revealed that environmental management measures for fishing practices are uncommon among sampled fishermen/women as majority (87.0%) were only engaged in traditional management strategies. Laws that were supposed to ensure sustainable fishing activities have been ineffective overtime. Regulation/laws to enforce fish availability (68.0%); conserve marine environment (100.0%); provide balance between supply and demand (73.0%); reduce fish deaths (88.0%); regulate type of marine transport (100.0%); ensure fish methods management (88.0%); and ecosystem management (78.0%) were unpopular environmental management measures among fishermen/women in the study area. Lack of motivation (85.0%); low budgetary allocation (89.0%) poor waste management (72.0%); over-exploitation of fishes amongst others were some of the challenges identified limiting sustainable fishing activities in the study area. The study recommended sound environmental laws and practices geared toward ensuring adequate environmental management and promoting sustainable fishing activities among fishermen/women should be the focus of the government.

Keywords: Environmental management, Sustainable, Fishing activities, Socio-economic, Livelihood, Fisheries

Introduction

Nigeria is located in West Africa bordering the Gulf of Guinea between Benin and Cameroon. It is a coastal state with a coastline of 853km and a 200 nautical miles Exclusive Economic Zone (EEZ) in which it has exclusive rights to the fish and other natural resources. The coastal water of Nigeria support artisanal fishing activities which occurs in creeks, estuaries and inshore areas in waters of less than 40m depth, while the industrial sector operates outside the 5 nautical miles one Nigeria has a total land area of 923, 768 sq.km and 13,000 sq.km of inland water bodies (Fisheries Committee for the West Central Guinea (FCWC), 2010).

Nigeria is Coastal state with huge fishery resources both in Marine and inland waters with about 800 species already known, (Fish Base, 2010). The huge Niger Delta Rivers, Niger and Benue, and their tributaries, natural lakes, wetlands and reservoirs constitute the total water area. The Federal Bureau of Statistics (2007) stated that thirty-five percent (35%) of animal protein consumed in Nigeria comes from fish, and that the Nigeria Delta contributes over 35 percent of the fish supply. However, despite its huge water resources, fish production is detrainning, resulting in 800,000 MT being imported in 2006 out of 1.5 million MT.

Fishing development in Niger Delta cannot be discussed without the inclusion of the activities of multinational oil companies. Human depends on their surrounding physical environment for resources they need for their survival. However, human exploitation of those resources causes environmental degradation (Adeyemo, 2003). Human's destructive influence on the aquatic environment in the form of sub-lethal pollution results in chronic stress that has negatives effects on aquatic life. The Niger Delta Serves as the Economic nerve centre of Nigeria Federation with it vast oil deposits. The Niger Delta, as defined officially by the Nigerian government, extends over about 70,000 km² and makes up 7.5% of Nigeria's land mass (Akpan, 2006). Historically and cartographically, it consists of present day Bayelsa, Delta, and Rivers State, but in 2000, however, president Obasanjo's regime included Abia, Akwa Iboma Cross Rivers, Edo, Imo and Ondo States in the region. The south-south Niger Delta, also known as the south-south zone; includes Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers State (Otoabasi, 2011).

It is obvious that most of the loss of freshwater biodiversity originates from systemic failure to understanding the linkages between developments activates and their impact upon freshwater ecosystems. For instance, Adeyemo (2003) and Strutton (2015) further noted that the major or main origins of aquatic pollution in the Niger Delta are Agriculture (run off fertilizers and pesticides), domestic sewage, and industrial pollution sources. Furthermore, the huge population growth, which has taken place in the Rivers state especially, has been accompanied generally by a strong expansion of uncontrolled urbanization, agricultural and industrial land use and that have resulted in a tremendous increase in pollutants discharge into water bodies or water ways which impact downstream uses of water.

In addition, the problem of over exploitation and inefficiency of fisheries management policy further hamper sustainable fishing in Nigeria. Therefore, the question that comes to mind is why

is it that over the last years, despite undeniable progress, the ability to monitor and assess the state of fish stocks and understand the economic and social forces that underlie ecosystem change, the status of fishery resources has deteriorated? The slowly dawning awareness that managing fisheries is more to do with managing the people involved in fisheries than it is with managing the resource is one element of the answer, since rarely have issues of equity been resolved (Nwabeze and Erie, 2013). It is therefore very important to recognize the interconnectivity between ecosystems management and sustainable fishing in Rivers State and Niger Delta as a whole. Fish resources are susceptible to environmental and man induced stresses and can deteriorate rapidly, particularly when environment and man act concurrently to limit production. Collapse of fisheries due to overfishing has been well documented in lakes. However, many cases are recorded where fishing and environmental pressures have together produced such a collapse (Seisay and Dufeu, 1997; Chilaka et al., 2014).

Eze and Eseoghene (2011) and Food and Agricultural Organization (FAO) (2011) noted that fish is the major source of animal protein for inhabitants of the Niger Delta region and the society at large. They further noted that the entire population depends solely on the marine ecosystem for their subsistence livelihood, thereby increasing poverty. This is because of the rich aquatic life and the large bodies of fresh water in the Niger Delta of Nigeria, there is a huge potential for the region to produce and supply a very high percentage of the domestic demand for fish, which was estimated at 2.2 metric tons per year in 2008 (FAO, 2011); hence, the study. The very important questions for the study are: what are the socio-economic characteristics of fishermen and women? Are there any environmental management systems put in place to help manage fishing activities? How sustainable are the fishing activities/practices in selected rivers in Rivers state, Nigeria?

Livelihood and Occupation of Occupants of Coastal zones

The Niger Delta region with Rivers state inclusive has a delicate mangrove swamp which covers a coastline of over 450km, about two-thirds of the entire coastline of Nigeria and the wetland in this region is traversed and crisscrossed by a large number of rivers, rivulets, streams, canals and creeks.

The people of the area are predominantly fishermen and women and crop farmers and other paid employments. These occupations are dominantly practiced by all age groups and sex in the study area. Farming as practiced in the area shows to be lucrative just as fishing; as major crops cultivated include cassava, plantain, cocoyam, vegetables, Coconut, Palm fruit, Plantain these crops fruits bountifully.

Fisheries Development and Interventions that affected its Growth in Nigeria

The history of fisheries development in Nigeria is comparatively a recent one though fisheries have been predominant specie for those residing along coastal region or zones, like inhabitants of

the Niger Delta and was majored in substance aspect of fisheries. Deliberate efforts at developing the country's fisheries can be said to have started in 1941. At that time no real national fisheries policy was in place, rather, programmes focused mainly on increased fish production through input supply at subsidized rates, technology transfer and revolving loan shames for fishermen. Although, Commencing from 1971. In the form of what is seen as interim measures pending the collection and collation of scientific information, the Nigerian Federal Government, with input from the Federal Development of Fishers, promulgated the Sea Fisheries Decrees of 1971, 1972 and 1992. The sea fisheries Decree (1971) was promulgated to Control and regulate coastal fisheries, along with sea licensing Regulation (1971); the sea fisheries (fishing) Regulations (1972); Exclusive Economic zone Decree of 1978 and inland fisheries Decree (1992). From the fore-going this Decrees were limited in scope and were directed at the following parameters:

- a. The 1971 Decree focused on registration and licensing of fishing trawlers operating in the coastal waters of Nigeria. The Catch quota for each boat was not induced in the decrees.
- b. The 1972 Decree placed restrictions on the cod-end of trawl nets used by industrial trawlers; however, details of the sizes of fish to be caught was lacking. It also restricted fishing trawlers from Operating within the first two nautical miles of the continental shelf; this restriction was later extended to 5 nautical miles in 1992.
- c. The 1992 Decree stipulates the condition for granting a fishing license for shipping and fishing, which requires application for pre-purchase assurance sand submission of feasibility studies.
- d. Regulation for in-land water fisheries were left for individual states to enacts out of the 36 states, only 15 states have fisheries ethics, laws or regulations in place. There are no official guidelines or codes of conduct for aquaculture in Nigeria.

The information on Table 1 displays the agricultural interventions that affected fisheries development in Nigeria.

Table 1: Agricultural Interventions

S/N	Agricultural Interventions	Year
1	National Accelerated food production programme (NAFPP)	1972
2	Agricultural Development projects (ADP)	1974
3	Operation feed the Nation	1976
4	River Basin and Rural Development Authorities.	1976
5	Green Revolution programme	1980
6	The world Bank-funded Agricultural Development project, National Fadama Development project. (NFDP)	1980

Source: Iwuchukwu and Ibokwe (2012)

The first comprehensive Agricultural Policy for Nigeria, with fisheries as a component, was developed by Federal Ministry of Agriculture and Water Resources (FMAWRD, 1988). Seven policy objectives were identified for fisheries and they are as follows:

1. Increasing domestic fish production.
2. Earning foreign exchange through the export of fish especially shrimps.
3. Developing local fisheries-based industries.
4. Rational management and conservation of fisheries resources for optimum use.
5. Encouraging the manufacturing of fish products.
6. Providing employment to Nigerians by mechanizing the sector
7. Increasing per capital income of indigenous fishers.

Adopted Management Measures for Sustainable Fishing

These measures were adopted to narrow the gap between supply and demand of fishes:

- i) Regulation through gear restriction
- ii) Gear selectivity
- iii) Seasonal and area closures and control of fishing effort
- iv) Resource and allocation through territorial right

In most cases, the measures listed above had to be implemented entirely or partly through policing by uniformed staff of fisheries department, applying state and federal laws and also local government by-laws. However, after about four decades it is clear that the policy enforcement approach has failed.

Reasons for the failure of the government-based enforcement strategies are as follows:

1. Lack of motivated and well-trained human resources at technical and sub-technical levels for enforcement.
2. Inadequate area coverage of enforcement infrastructures
3. Low budgetary allocation by government to fisheries sector
4. Corruption of low enforcement agents
5. Lack of fisheries data which to base management decisions, there is no even a data-base, or data are fabricated in the data recorder's office instead of thorough visits to the landing sites
6. Isolation of the resource owners that is the fisheries community.

The short review of past developments and challenges hampering sustainable fishing in Niger Delta were highlighted for the purpose of exposing the historical views as regards the status of fishing activities and the human and environmental factors impeding its growth overtime. The study therefore seeks to find out if there are environmental management systems put in place to help manage fishing activities and examine if such practices/measures are sustainable for fishing activities using selected coastal areas and communities in Rivers state, Nigeria as case studies.

Materials and Methods

The study area is Rivers state which belongs to the core Niger Delta states (Figure 1). The coastal areas in Rivers state are interrupted by series of distributaries that form the Niger Delta swamp at the middle where the lower Niger River system drains the waters of Rivers Niger and Benue into the Atlantic Ocean. This delicate mangrove swamp of the Niger Delta covers a coastline of over 450km, about two-thirds of the entire coastline of Nigeria and the wetland in this region is traversed and crisscrossed by a large number of rivers, rivulets, streams, canals and creeks (Ekubo & Abowei 2011). The Niger Delta is a rich mangrove swamp in the southernmost part of Nigeria within the wetlands of 70,000km² formed primarily by sediment deposition. It is the largest mangrove swamp and wetland in Africa, maintaining the third largest drainage basin in the continent, and is also the third largest wetland in the world after Holland and Mississippi (Ekubo & Abowei 2011). The temperature is blessed with abundant sunshine, which makes the months of February, March and April recording the highest temperature which reduces as the year progresses towards December (Ekemini, 2012). The rainfall pattern exhibits a double maxima regime. Rainfall is high in July and September with a little dry season which occurs in August. The study area lies in the coastal belt with areas below mean sea level with formation belonging to the sedimentary formations of the recent Niger Delta. Generally, the land surface slopes gently, in a north-west, south-east direction. The entire region is crisscrossed by several rivers and creeks which empty into the Atlantic Ocean. The mouth of the creeks and rivers such as the Bonny and New Calabar Rivers not only allow the rivers to empty into the Atlantic but also serve as the inlet of vast quantities oceanic water into the tidal basins (Hoiberg, 2013). The soil of the area belongs to the sandy and sandy loam type, which are underlain by impervious pan constantly leached by the heavy rainfall experienced over the area. The vegetation is consistently nourished with high rainfall and high temperature, which provide favourable condition for the growth of a varieties of trees like mahogany (*Khaya grandifoliola*), Obeche (*Triplochiton scleroxylon*), Afara (*Diospyros celebica*) and abundance of oil palm trees and several other species of economically valuable trees such as raffia palm, shrubs, ferns, and floating grasses, also form of the vegetation (Adeomo, 2013). The people are majorly engaged in fishing and farming. The capital city which is Port Harcourt has witnessed developments in socio-economic activities, which thus, promoted transportation (land, water and air), exploration and oil production, crafts and tourism for the state.

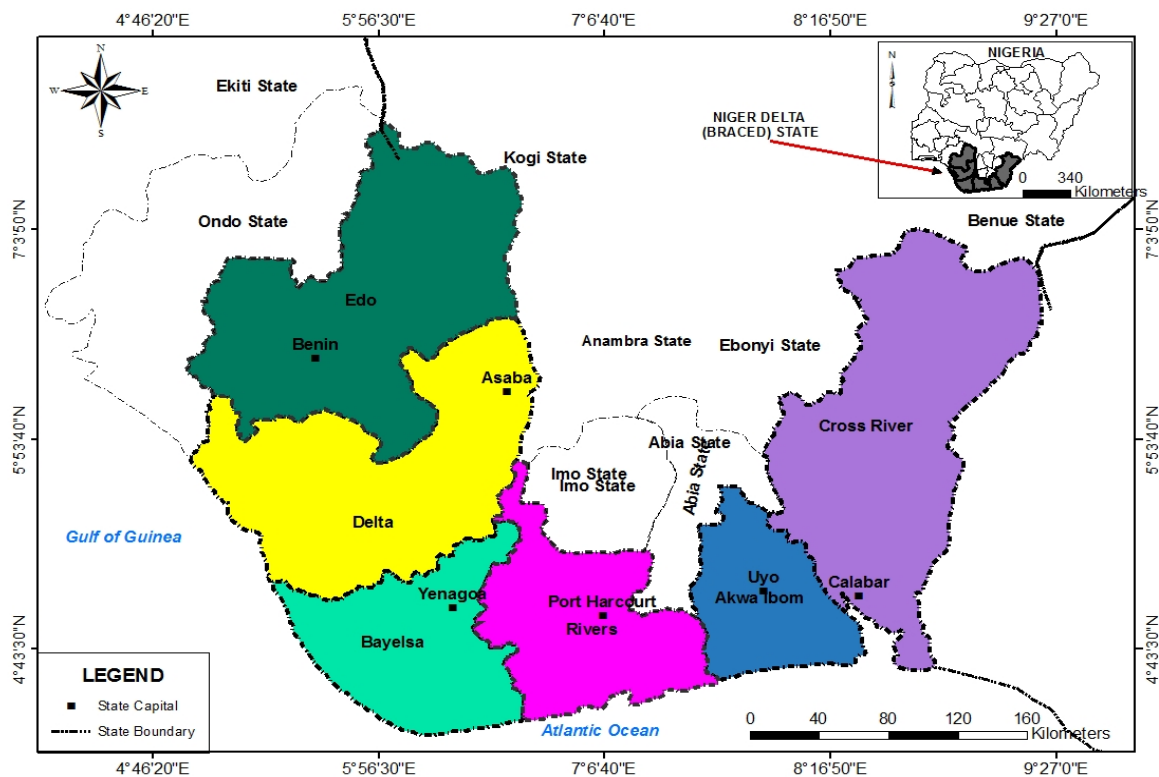


Figure 1: Core Niger Delta States with Rivers state at the Centre (Highlighted in Purple)

The cross-sectional research design which endeavor to collect information from respondents across the population at a specific time in the study area was employed for this study. The primary data was acquired from the field surveys which involved the administration of questionnaires to the target population. The target populations were fishermen/women in coastal communities in different LGAs in Rivers State. Multistage sampling method was employed for determination of sample size for the study. The coastal LGAs in Rivers State are 11 in number according to Niger Delta Budget Monitoring Group (NDEBUMOG) (2014). The study therefore listed out these LGAs (Akuku-Toru, Andoni, Asari-Toru, Abual-Odual, Degema, Bonny, Ogba-Egbema, Opobo/Nkoro, Okrika, Ogu-Bolo, and Port Harcourt) one by one on a paper and put them in a container. These areas are regarded as fishing settlements. The next exercise was to draw out five names (45%) of LGAs at random in order to give each LGA equal chance of being selected. From the five LGAs selected one community was randomly picked from each LGA (Table 2). Thereafter, convenient sampling method was used to obtain a sample size of 100 fishermen/women for the study who have at least 5 years of fishing experience. In each of the community a total of 20 fishermen/women were selected for the study.

Table 2: Details of Questionnaire Administration for the Study

S/N	LGA	Communities	Number of copies of questionnaire Administered
1	Akuku Toru	Soku	20
2	Andoni	Anyama	20
3	Degema	Usokun-Degema	20
4	Ogba/Egbema/Ndoni	Akputa waterside	20
5	Okrika	Abam Ama II	20
	Total		100

Source: Researcher's Field Analysis (2021)

The study employed effective retrieval of questionnaire was employed to ensure that all questionnaires were answered and returned which makes the return rate 100%. Descriptive statistics was used for data presentation. Questionnaire samples returned were coded, recorded in excel worksheet 2010 and imported into the Statistical Package for Social Scientist (SPSS) 24.0 version for data analysis.

Results and Discussion

Socio-economic Characteristics of Respondents

The demographic information of sampled respondents is presented on Table 3. The distribution revealed that 68.0% respondents were males while the remaining 32.0% were females. The age category of sampled respondents for the study showed that 12% of respondents were between 21 and 30 years, 26% were between 31 and 40 years, 43% were between 41 and 50 years; while the remaining 19% were between 51-60 years. However, none of the sampled respondents were above 60. The analysis shows that majority of the fishermen for the study was between 21 and 50 years. The marital status of respondents showed that 25% of total respondents were single, 54% were married, 8% were divorced while 9% were widowed and 4% was separated. The educational status of sampled respondents revealed that 40.0% have primary education; 36.0% have secondary education; 7.0% of respondents belong to the tertiary education level while the remaining 17.0% have no formal education. The monthly income of sampled respondents revealed that 48.0% from the entire respondents had monthly income between #5,000.00 and #30,000; 38.0% of sampled respondents were found between #31,000 and #50,000; 10.0% were earning between #100001 and #150000 while 8.5%, 5.5% and 2.5% were collecting salary between #51,000 and #75,000; while the remaining 4.0% claim they earn between #76,000 and

#100,000. It can be deduced from the analysis that as the monthly income increases, the numbers of individual workers are reducing suggesting fewer fishermen/women making profit from their fish enterprise. The year of experience of sampled respondents revealed that 5% of the respondents had between 5 and 7 years experience; 8% of respondents had experience between 8 and 10 years. It can be observed also that 29% had experience between 11 and 14 years, 30% had experience between 15 and 20 years while 28% had experience of more than 20 years. The implication of this is that majority of the respondents would have understanding and knowledge of their environment and the satisfaction being derived over the years. The mode of fishing practice was also examined among sampled respondents and it was observed that 93% of respondents are into fishing activities on a regular while the remaining 7% are not regular.

Table 3: Socio-economic Characteristic of Sampled Respondents for the Study

Socio-economic Characteristics	Response Frequency	Percentage (%)
Sex		
Male	68	68.0
Female	32	32.0
Age (years)		
21-30	12	12.0
31-40	26	26.0
41-50	43	43.0
51-60	19	19.0
Above 60	-	-
Marital Status		
Single	25	25.0
Married	54	54.0
Divorced	8	8.0
Widowed	9	9.0
Separated	4	4.0
Educational status		
Primary	40	40.0
Secondary	36	36.0
Tertiary	07	7.0
No formal education	17	17.0
Average Monthly income (#)		
5,000-30,000	48	48.0
31,000-50,000	38	38.0
51,000-75,000	10	10.0
76,000-100,000	4	4.0
Above 100,000	-	-
Fishing Experience		
5-7 years	5	5.0
8-10 years	8	8.0
11-14 years	29	29.0
15-20 years	30	30.0
More than 20 years	28	28.0
Fishing practices		
Regular	93	93.0
Non-regular	7	7.0

Source: Researcher's Computation, 2021

Environmental Management System for Sustainable Fishing

The existence of laws toward the environmental management system for sustainable fishing activities in the study area was examined among sampled fishermen/women and the information was displayed on Table 4. The information as regards regulation/control methods toward fish availability revealed that 32% agreed that such control methods exist in their community; while the remaining 68.0% disagreed which means it may exist but no form of control or force is in place to curb activities that will promote fish availability. The study observed that no working law ensuring the protection of marine environment exists during fishing activities in the study area. The findings as regards laws balancing the gap between supply and demand of fishing revealed that 27.0% of respondents agreed that laws are provided while the remaining 73.0% sampled respondents says laws are not provided to balance the gap between supply and demand. The results for on-ground pollution control laws to reduce fish deaths revealed that only 11.0% of total respondents agreed that there is provision for laws protecting fishes against pollution; on the other hand, 88.0% of sampled respondents disagreed; however, only 1.0% of the population of respondent gave no response. Thus, more than 80.0% of respondents were of the opinion that even though pollution control laws may exist but the level of enforcement is minimal in the study area. The responses received as regards the restriction on type of marine transport usage showed that respondents are not aware of any such law. Boat propellers can serve as a death trap to fishes in the marine environment so there is need to properly checkmate boat type usage. In addition, the information for provision of laws in the management of fishing methods for reef protection showed that 88.0% of respondents have not experienced any of such laws; while 12.0% of respondents have experienced such laws in the study area. The information regarding laws regulating the type of fishing methods utilized revealed that 90.0% of the sampled fishermen are not aware of any functioning laws regulating the fishing methods employed by fishermen/women. However, the remaining 10.0% of respondents are not sure if such law exists. Findings regarding the existence of traditional co-management efforts revealed that 87.0% of sampled respondents agreed to the presence of co-management strategies by communities; while the remaining 13.0% of sampled respondents have not yet feel the impact of traditional co-management strategies by their community leaders towards sustainable fishing activities in the study area. The study discovered that 12.0% of sampled respondents indicated that some laws helping to manage the ecosystem actually exist while 88.0% of the remaining respondents are yet to feel the impact of any law on ecosystem management.

Table 4: Environmental Management Measures for Fishing

Measures	Strongly Agree	Agree	Disagree	Strongly disagree	No response
Regulation/Control methods toward fish availability	0 0.0%	32 32.0%	19 19.0%	49 49.0%	0 0.0%
There are regulation enforcing the conservation of marine environment	0 0.0%	0 0.0%	85 85.0%	15 15.0%	0 0.0%
Laws are provided to balance the gap between supply and demand	10 10.0%	17 17.0%	43 43.0%	30 30.0%	0 0.0%
Pollution control laws to reduce fish death/extinction	0 0.0%	11 11.0%	78 78.0%	10 10.0%	1 1.0%
Restriction on type of marine transport usage	0 0.0%	0 0.0%	27 27.0%	73 73.0%	0 0.0%
Provision of laws in the management of fishing methods for reef protection	0 0.0%	12 12.0%	19 19.0%	69 69.0%	0 0.0%
Functioning laws regulating fishing methods	0 0.0%	0 0.0%	30 30.0%	60 60.0%	10 10.0%
Traditional Co-management strategies	10 10.0%	77 77.0%	13 13.0%	0 0.0%	0 0.0%
Ecosystem based management strategies	0 0.0%	12 12.0%	23 23.0%	65 65.0%	0 0.0%

Challenges to Sustainable Fishing in the Study Area

The information for the challenges to sustainable fishing in the study area is displayed on Table 5. The challenges as identified among sampled fishermen/women were lack of motivation (85.0%); low budgetary (89.0%); poor waste management (72.0%); discharge of industrial effluents (69.0%); agricultural pollution (74.0%); over-exploitation of fishes (86.0%); harmful fishing practices (61.0%); hydrology and changes in seasons (73.0%); oil pollution (78.0%); institutional changes (84.0%) and local sand mining (76.0%). Thus, these identified challenges have several implications on the environmental management system of fishing; its effect will be on the socio-economic livelihood of fishermen/women in the study area. These are the core challenges affecting sustainable fishing activities in the study area.

Table 5: Challenges to Sustainable Fishing Activities in the Study Area

Challenges	Frequency	%
Lack of motivation on the part of the government	85	85.0
Low budgetary allocation	89	89.0
Poor waste management that pollutes IWT which affects fishing activities	72	72.0
Discharge of industrial effluents	69	69.0
Agricultural pollution	74	74.0
Over-exploitation of fishes	86	86.0
Harmful fishing practices like use of toxic plants at the upstream of river	61	61.0
Hydrology/Environmental changes in river sources and its seasonalities	73	73.0
Oil pollution	78	78.0
Institutional changes affecting stability, resilience, equitability and efficiency	84	84.0
Local sand mining	76	76.0

Discussion of Findings

Findings of the study revealed that the environmental management systems (EMS) for fishing are minimal in the study area. EMS are tools directed at ensuring that fishing activities are carried out in consideration of the environment. Thus, regulation control activities are supposed to control fishing activities based on fish availability, marine conservation, balancing the gap between supply and demand of fishes, pollution control to reduce environmental impact as well as fish extinction, restrictions on type of marine transport usage and so on. However, findings revealed little or no effect of these regulation activities as indicated by majority of sampled fishermen/women in the study area. The issue of little or no regulation to control fishing activities may be attributed to the fact that poor community based approach was not ensured by the government. Findings of the study are similar to the findings of FAO (2007) that discovered that there is need for community based approach to law enforcement in order to manage fishing activities environmentally and economically among rural communities in Rivers State.

According to Olaoye and Ojebiyi (2018) several fisheries act has been promulgated in order to enforce the environmental management of fishery in coastal areas in Nigeria especially in the Niger Delta region. The laws listed out started out in 1971 and was called the Sea Fisheries Act of 1971. The laws continued as Sea Fisheries (Licensing) Regulation of 1971; Sea Fisheries (Fishing) Regulating of 1972; Exclusive Economic Zone Decree of 1978; Sea decree of 1992 and

the Co-Sea Fisheries Regulations of 1995. All these laws and regulations are geared toward regulating fishing activities which should have effect on availability, supply and demand, pollution control, reduction in environmental impact and so on. However, as declared by Nwosu, Ita and Enin (2011) and Olaoye and Ojebiyi (2018) that the laws established by the government did not have any effect because the laws lack associated policies that need essential data for its survival and that it also requires additional scientific information for its enforcement.

The issues of sustainable fishing practices are also embedded within the confinement of enforcing functioning laws to checkmate fishing activities. For instance, as discovered by FAO (2013) goals of sustainable fisheries development are to improve welfare of stakeholders directly and indirectly by establishing a more sustainable and optimal use of available fisheries. In the face of the laws and regulations fishing activities employed as discovered from the study are not effective. There are several challenges posing difficulty in monitoring, regulating and enforcing laws that will aid environmental management and sustainability of fishing activities. These challenges as identified by Agbeja (2011) are associated with mending the gap between supply and demand of fishes, that, these challenges are increasing and usually take the form of constant degradation and pollution, lack of adequate infrastructures to support fishing; weak policy; lack of relevant data; and limited institutional capacity. Olaoye and Ojebiyi (2018) also discovered that the gap between supply and demand of fishery resources is increasing due to excessive use of traditional fishing methods in the face of rising population figures.

Bene (2003) and FAO (2013) believed that environmental management in fishery can focus on summing up all management procedures to achieve biological, ecological, economic and social objectives in the face of these challenges. Fishery management should be seen as a subsector in Nigeria making driving steps toward rural development through its provision of income, high-quality protein and socio-economic development of fishing communities in Nigeria (Olaoye and Ojebiyi, 2018). Thus, there is need for re-assessment, and focus should be directed to information gathering and data management in all fishery sub sector in Rivers State.

Conclusion and Recommendation

Findings of the study have revealed that environmental management laws aimed at promoting sustainable fishing activities in the study area have not been effective. The study discovered that not much was achieved by fishermen/women whose practices are mostly traditional. Thus, laws that were directed at promoting fishing activities and enforcing actions to help protect the environmental systems were not adequate. Thus, sound environmental laws and practices geared toward ensuring adequate environmental management and promoting sustainable fishing activities among fishermen/women should be the focus of the government. Thus in line with the findings, the study recommends that the government should be proactive in dealing with the challenges of sustainable fishing activities by ensuring they increase their support in these coastal communities; laws with relevant information that will ensure sustainable fishing to help

effect the necessary changes needed for development are to be implemented in the study area; the activities contributing to pollution of coastal rivers should be checkmated so as to reduce its direct and indirect impact on fishes.

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